

VIA-FIRST DUAL DAMASCENE PROCESS

Abstract

The present invention pertains to a via-first dual damascene process. A semiconductor substrate having a conductive structure and a dielectric layer on the semiconductor substrate is provided. The dielectric layer has a via opening exposing the conductive structure. The via opening is filled with a gap-filling polymer to form a gap-filling polymer (GFP) layer on the dielectric layer. The GFP layer is etched back to a predetermined depth such that an exposed surface of the GFP layer is lower than surface of the dielectric layer to form a recess, thereby exposing portions of sidewalls of the via opening. A surface treatment for altering surface property of the sidewalls and the exposed surface of the GFP layer is then carried out, thereby preventing a subsequent deep UV photoresist from interacting with the sidewalls or the exposed surface of the GFP layer either in a chemical or physical way.